CLAIMS

1. An electrically controllable light diffuser (80), comprising:

an optical medium (94) and an electro-optic medium (95) arranged with an effective optical interface between a first surface of the optical medium (94) and a first surface of the electro-optic medium (95); and

transparent electrodes arranged for providing an electric field across the electro-optic medium (95) so as to allow control of the refractive index of the electro-optic medium (95) by application or non-application of an electric field across the electro-optic medium (95); wherein

one of the first surface of the optical medium (94) and the first surface of the electro-optic medium (95) is structured with a surface profile, the surface profile comprising plural surface angles such that (i) when the refractive index of the electro-optic medium (95) is controlled by application or non-application of an electric field to be substantially equal to the refractive index of the optical medium (94) there is substantially no refraction arising from the effective optical interface between the first surface of the optical medium (94) and the first surface of the electro-optic medium (95), and such that (ii) when the refractive index of the electro-optic medium (95) is controlled by application or non-application of an electric field to be different from the refractive index of the optical medium (94) refraction does take place at the effective optical interface between the first surface of the optical medium (94) and the first surface of the electro-optic medium (95), and, by virtue of there being plural surface angles, the refraction directs light to a corresponding plurality of angles thereby providing a diffusion effect.

2. A diffuser according to claim 1, wherein the plural surface angles are distributed differently in different surface directions such that light is diffused to different extents in different surface directions.

3. A diffuser according to claim 1 or 2, wherein the refractive index of the electro-optic medium (95) is substantially equal to the refractive index of

the optical medium (94) when an electric field is applied across the electro-optic medium (95), and the refractive index of the electro-optic medium (95) is different from the refractive index of the optical medium (94) when no electric field is applied across the electro-optic medium (95).

4. A diffuser according to any of claims 1 to 3, wherein the electro-optic medium (95) comprises small droplet polymer dispersed liquid crystal.

5. An autostereoscopic display device, comprising:

an array of sub-pixels (12) or pixels (30);

directing means (15) comprising a plurality of directing elements (16);

groups of the sub-pixels (12) or pixels (30), each group comprising plural sub-pixels (12) or pixels (30), being arranged in correspondence with respective directing elements (16); and

an electrically controllable diffuser (80); the electrically controllable diffuser (80) comprising:

an optical medium (94) and an electro-optic medium (95) arranged with an effective optical interface between a first surface of the optical medium (94) and a first surface of the electro-optic medium (95); and the electrically controllable diffuser (80) further comprising:

transparent electrodes arranged for providing an electric field across the electro-optic medium (95) so as to allow control of the refractive index of the electro-optic medium (95) by application or non-application of an electric field across the electro-optic medium (95); wherein

one of the first surface of the optical medium (94) and the first surface of the electro-optic medium (95) is structured with a surface profile, the surface profile comprising plural surface angles such that (i) when the refractive index of the electro-optic medium (95) is controlled by application or non-application of an electric field to be substantially equal to the refractive index of the optical medium (94) there is substantially no refraction arising from the effective optical interface between the first surface of the optical medium (94) and the first surface of the electro-optic medium (95), thereby providing a non-diffusing

mode, and such that (ii) when the refractive index of the electro-optic medium (95) is controlled by application or non-application of an electric field to be different from the refractive index of the optical medium (94) refraction does take place at the effective optical interface between the first surface of the optical medium (94) and the first surface of the electro-optic medium (95), and, by virtue of there being plural surface angles, the refraction directs light to a corresponding plurality of angles thereby providing a diffusion mode;

the sub-pixels (12) or pixels (30), the directing means (15), and the electrically controllable diffuser (80) being arranged such that:

when the diffuser (80) is in the non-diffusing mode, light from different sub-pixels (12) or pixels (30) within a group is directed in different directions by the corresponding directing element, thereby providing a 3D mode; and

when the diffuser (80) is in the diffusing mode, light from different sub-pixels (12) or pixels (30) within a group is mixed.

6. A display device according to claim 5, wherein in the diffusing mode the extent of diffusion is sufficient to provide sufficient mixing to provide a substantially 2D image.

7. A display device according to claim 5, wherein in the diffusing mode the extent of diffusion is only sufficient to provide sufficient mixing to provide an image intermediate between 2D and 3D.

8. A display device according to any of claims 5 to 7, wherein the directing means (15) is a lenticular sheet and the directing elements (16) are lenticular elements.

9. A display device according to claim 8, wherein the sub-pixels (12) or pixels (30) are arrayed in rows and columns; the lenticular elements are arranged substantially parallel with the columns, such that groups of the sub-pixels (12) or pixels (30) along a row are arranged in correspondence with respective lenticular elements; and the plural surface angles are distributed

differently in the row and column directions such that in the diffusing mode light is diffused more in the row direction than in the column direction.

10. A display device according to any of claims 5 to 9, wherein the refractive index of the electro-optic medium (95) is substantially equal to the refractive index of the optical medium (94) when an electric field is applied across the electro-optic medium (95), and the refractive index of the electro-optic medium (95) is different from the refractive index of the optical medium (94) when no electric field is applied across the electro-optic medium (95), so that the diffusing mode is achieved when no electric field is applied.

11. A display device according to any of claims 5 to 10, wherein the electro-optic medium (95) comprises small droplet polymer dispersed liquid crystal.